WE CLAIM:

1. A magnetron atomization source, comprising a target body having an atomization surface which is mirror-symmetrically concavely constructed with respect to at least one plane, a magnetic circuit arrangement operable to generate a magnetic field over the atomization surface, including an anode arrangement, a receiving frame which extends around an edge of the target body and is electrically insulated with respect thereto, which receiving frame has a receiving opening for at least one workpiece to be coated, and, on the side of the source, a process space bounded substantially by the atomization surface of the target body and a surrounding non-atomized residual interior surface of the receiving frame, except for the receiving opening for the at least one workpiece, wherein the surrounding non-atomized residual interior surface is minimized so that, during an atomizing operation, a stable plasma discharge is ensured.

2. The source according to claim 1, wherein the residual interior surface, F_9, and the atomization surface, F_1, of the target body, are related such that $F_9 \leq 50\% F_1$.

3. The source according to claim 2, wherein $F_9 \leq 40\% F_1$.

4. The source according to claim 2, wherein $F_9 \leq 30\%$ F_1.

5. The source according to Claim 1, wherein the magnetic circuit arrangement is configured to be switchable to an electric potential of the target body.

6. The source according to claim 1, wherein the atomization surface in a new state is constructed as one of a paraboloid and spherical surface with respect to the receiving opening.

7. The source according to claim 1, wherein the atomization surface is one of circular, oval and rectangular in plan view.

8. The source according to claim 1, wherein the magnetic circuit arrangement is configured to maintain the atomization surface in a concave, continuously curved construction, during the atomizing operation.

9. The source according to claim 1, wherein the magnetic circuit arrangement is constructed such that a directional characteristic with respect to atomized-off particles of the atomization surface with respect to the receiving opening is essentially maintained during the atomizing operation.

10. The source according to claim 1, wherein, for coating a workpiece disk having a center to be covered, a masking core projects centrally through the target body to a level of the receiving opening.

11. The source according to claim 1, wherein gas outlets are arranged centrally with respect to the atomization surface to supply a process gas.

12. The source according to claim 1, wherein a distance between the atomization surface in a new state and a plane of the receiving opening with respect to a diameter, Φ_k, of the receiving opening is 20% $\Phi_k \leq d_{113}$.

13. The source according to claim 1, wherein the distance between the atomization surface in a new state and a plane of the receiving opening with respect to the diameter, Φ_k, of the receiving opening is $d_{113} \leq 50\%$ Φ_k.

14. The source according to claim 13, wherein $d_{113} \leq 42\%$ Φ_k.

15. The source according to claim 13, wherein $d_{113} \leq 35\%$ Φ_k.

16. The source according to claim 1, wherein the distance between the atomization surface in a new state and a plane of the receiving opening is at least 25 mm.

17. The source according to claim 16, wherein the distance is between 30 mm and 55 mm.

18. The source according to claim 16, wherein the distance is between 30 mm and 35 mm.

19. The source according to claim 12, wherein the receiving opening is circular and has a diameter of between 50 mm to 150 mm.

20. The source according to claim 12, wherein the diameter is between 75 mm to 150 mm.

21. The source according to claim 1, wherein a diameter of the atomization surface is between 30% and 40% larger than a diameter of the receiving opening.

22. The source according to claim 1, wherein, for circular workpiece disks, the receiving frame is parallel to a plane of the receiving opening and has a width, Δ, of $0 \leq \Delta \leq 10\% \phi_k$, wherein ϕ_k is the smallest workpiece diameter.

23. The source according to claim 22, wherein the width is $0 \leq \Delta \leq 20\% \phi_k$.

24. The source according to claim 22, wherein the width is approximately 15% ϕ_k.

25. The source according to claim 1, wherein the residual interior surface of the receiving frame perpendicular to a plane of the receiving opening has a depth, a, which, with respect to a maximal distance, d_{113}, between the atomization surface and the opening plane of the receiving opening, is dimensioned as $a \leq 50\%\ d_{113}$.

26. The source according to claim 25, wherein $a \leq 40\%\ d_{113}$.

27. The source according to claim 25, wherein $a \approx 30\%\ d_{113}$.

28. The source according to claim 1, wherein at least a portion of the receiving frame is one of applied to a reference potential and is operated in a floating manner.

29. The source according to claim 28, wherein the reference potential is variable.

30. The source according to claim 28, wherein the reference potential is anodic.

31. The source according to claim 1, wherein a coating rate during service life of the target body decreases by less than 50% of an initial rate.

32. The source according to claim 1, wherein an electric insulation is provided at least one high magnetic field intensity location to prevent discharges.

33. A method of using an atomization source comprising a target body having an atomization surface which is mirror-symmetrically concavely constructed with respect to at least one plane, a magnetic circuit arrangement operable to generate a magnetic field over the atomization surface, including an anode arrangement, a receiving frame which extends around an edge of the target body and is electrically insulated with respect thereto, which receiving frame has a receiving opening for at least one workpiece to be coated, and on the side of the source, a process space bounded substantially by the atomization surface of the target body and a surrounding non-atomized residual interior surface of the receiving frame, except for the receiving opening for the at least one workpiece, wherein the surrounding non-atomized residual interior surface is minimized so that, during an atomizing operation, a stable plasma discharge is ensured, comprising the step of providing storage disks with atomization coating.

add E27